***Time Critical Diagnosis-Stroke/STEMI Implementation***
***Meeting Two, October 21, 2008***
***Meeting Highlights***

## ATTENDEES:

Dr. Samar Muzaffar, Department of Health and Senior Services ( DHSS); Paula Adkison, DHSS; Mark Alexander, CoxHealth; Dr. Lynthia Andrews, Heartland Regional Medical Center; Lisa Archer, Northeast Regional Medical Center; Steve Bassett, Ozarks Medical Center; Jack Bates, Air Evac Lifeteam; Carol Beal, St. John's Regional Health Center; Anita Berwanger, DHSS; Nancy Bettasso, St. John's Regional Medical Center; Linda Black, Pike Memorial County Hospital; Shandy Bowman, Research Medical Center; Barbara Brendel, DHSS; Jo-Ann Burns, Barnes-Jewish Hospital; Donna Cash, North Kansas City Hospital; Patrick Carron, Perry County Memorial Hospital; Dr. Douglas Char, St. Louis University Hospital; Doug Clark, Herman Area EMS; Lorie Cobb, Northwest Medical Center; Karen Connell, DHSS; Richard Cotter, Taney County Ambulance District; Susan Davis, St. John's Mercy Medical Center; Liz Deken, American Heart Association; Kathy DeVries, Barnes-Jewish Hospital; Jennifer Dewitt, Hedrick Medical Center; Marcia Dial, Scotland County Memorial Hospital; Lisa Donnelly, St. Luke's Hospital; Joan Drake, Staff for Life Helicopter Service; Mary Jo Draper, The Vandiver Group; Dr. Scott Duff, Cox Stroke Center; Valerie Dutcher, Heartland Regional Medical Center; Joan Eberhardt, DHSS; Johanna Echols, Missouri State Medical Association; Katie Egan, Barnes-Jewish Hospital; Rhonda Evans, Community Hospital Association; Jane Falk, Carondelet Heart Institute of St. Joseph Medical Center; Kelly Ferrara, The Vandiver Group; Cindy Feutz, University of Missouri Hospital and Clinics; Shirley Gastler, DHSS; Dolly Giles, Pike County Memorial Hospital; Michael Graves, North Kansas City Hospital; Al Green, Rusk Rehabilitation, Gina Gregg, Research Medical Center; Paul Guptill, Missouri Hospital Association; Robin Hamann, American Heart Association; Dr. Kathryn Hedges, Lee's Summit Medical Center; Kathleen Henderson, St. Joseph Medical Center; Michael Hicks, Mid-American Regional Council; Linda Hill, St. Anthony's Medical Center; Sean Hill, Linn County Ambulance District; Lindy Huff, St. Luke's Hospital; Elizabeth Hunter, St. John's Hospital; Lisa Hutchison, St. John's Regional Health Center; Jody Hyman, DHSS; Judy James, American Heart Association; Freida Juliano, Hannibal Regional Hospital; Dr. Dennis Keithly, St. John's Mercy Medical Center; Daniel Kernebeck, St. Louis University Hospital, Shelleen King, St. Luke's Brain and Stroke Institute; Jerry Kirchhoff, Air Evac Lifeteam; Dr. George Kichura, St. John's Mercy Heart and Vascular; Mary Kleffner, DHSS; Dr. Michael Klevens, St. Lukes Hospital; Brenda Knight, Putnam County Memorial Hospital; Ken Koch, St. Charles County Ambulance District; Dr. Charles Krin, Phelps County Regional Medical Center; Michael Lambert, University of Missouri Health Care; Michelle Leassner, DesPeres Hospital; Theresa Lee, Community Hospital Assn; Bonnie Linhardt, American Heart Association; Dean Linneman, DHSS; Jason Lynch, St. John's Mercy Medical Center; Bryant McNally, Missouri Hospital Association; Deborah Markenson, DHSS; Dr. Steve Marso, Cardiovascular Consultants; Chris Medlin, Capital Region Medical Center; Bill Meeker, Laredo Fire Department; Amy Michael, Sullivan County Memorial Hospital; George Miller, Boone County Fire Protection District; Eric Mills, University Hospital Ambulance Service; L.E. Mire, Taney County Ambulance District; Sharon Monical, Missouri Baptist Medical Center; Greg Natsch, DHSS; Carol Nierling, University of Missouri Hospital and Clinic; Peggy Parks, Northeast Regional Medical Center; Cynthia Peters, St. Mary's Medical Center; Dr. Raana Ponstingl, Des Peres Hospital; Sharon Pulver, St. Joseph Health Center; Katie Quigley, Physio-Control; Pam Ragan, Cedar County Memorial Hospital; Leslie Reed, Missouri Foundation for Health; Phil Renner, Pike County Memorial Hospital, Lisa Riggs, St. Luke's Health System; Connie Roberts, Putnam County Memorial Hospital; Dr. John Russell, Cape County Private Ambulance Service; Twany Sandifer, Capital Region Medical Center; Chris Schulze, CoxHealth; Barb Seagrass, Des Peres Hospital; Dr. Niranjan Singh, University of Missouri School of Medicine; Nancy Slater, Sondra Solomon, Barnes-Jewish Hospital; Edward Spain, St. John's Regional Health Center; Mary Spencer, Barnes-Jewish Hospital; Debby Sprandel, St. Francis Medical Center; David Stagner, St. Francis Medical Center; Chad Staley, Montgomery County Ambulance District; Debbie Summers, St. Luke's Brain & Stroke Institute; Kelly Thomas, St. John's Regional Medical Center, Dr. Alan Umbright, SSM St. Joseph, St. Charles; Michael Wallace, Central Jackson Fire Protection District; Jim Waring, Wheeler Heart and Vascular Center, Terri Waters, The Vandiver Group; Dr. Richard Webel, University of Missouri Health Center; Marilyn Welling, St. John's Medical Center; Jason White, Metropolitan Ambulance Service Trust; Dick Wiles, Genentech; Jeff Wilson, North Kansas City Hospital; Amy Wood, American Heart Association; Steve Woods, Des Peres Hospital; Tricia Workman, Stinson, Morrison and Hecker; Darrell Wright, Chillicothe Emergency Services; Monroe Yancie, St. Louis Fire Department; and Beverly Smith, DHSS.

## General Information

A total of 123 people attended the second meeting in Columbia for the Time Critical Diagnosis (TCD) Stroke and STEMI system implementation process. Dr. Muzaffar welcomed the group and provided an overview of the TCD-Trauma System Task Force activities that are occurring in parallel to the stroke and STEMI work. The designation process for trauma centers has been in place for over ten years and they are addressing regional committee functionality, whether to establish an additional level IV for trauma center designation, use of common classification and language across regions and the State, protocols for triage and transfer, quality improvement functions and professional and public education. Lessons learned from the trauma arm of the TCD system are useful for guiding and directing the work for stroke and STEMI system development.

The feedback from the evaluations completed at the last meeting guided the following actions: 1) added more time to the agenda for sub-group discussion, 2) provided facilitators for each group, 3) improved availability of resources by expanding the Department (http://www.dhss.mo.gov/TCD_System/index.html ) and 360°/365 (http://www.360365.org/index.php) websites, 4) established capacity for participants to connect between meeting dates—The Vandiver Group established a password protected work zone on the 360°/365 website for participants to review and comment on work products, and 5) provided overview of process.

Accomplishments from the last meeting were reviewed by the group leads and the full group divided into the stroke, STEMI and out-of-hospital working groups to address priorities for this meeting. At the end of the day the following points were presented:

- Will be important for each of the respective groups to identify where they need to interface with the other working groups so that time can be built into the meeting series.
- It is advantageous to identify controversies and barriers to implement the stroke and STEMI system components in order to find solutions to improve implementation successes.
- Must assure that there is careful consideration of everyone's perspective.
- Must keep the meetings moving forward. Due to the open-ended nature of participation there may be new participants at meetings. It is the expectation that these new members review past highlights and come prepared to participate in the discussion. This supports forward movement after the group considers all points of view and reaches consensus.

Kelly Ferrara reviewed the process to access the work zone on the 360°/365 website. Any one who has officially enrolled as a participant or attended one of the TCD meetings has been enrolled for the work zone access. Work groups are able to share documents via the Web site www.360365.org. To post documents to the site, please email them to Cassie McCloud at cmccloud@vandivergroup.com. The document will be added to the site under the appropriate folder.

## Out-of-Hospital Work Group—Ken Koch, Lead

Key Accomplishment: Framework established for focus areas for out-of-hospital areas of work and leads for the four key categories identified. (See below)

Interface areas:

- Type of technology proposed must be compatible between out-of-hospital and hospital services.
- Clearly define the hand-off issues

Key areas for discussion at the next meeting: review and modify protocols for triage and transport.

Homework: review draft protocols.

## Process Map for Pre-Hospital Protocol

**Emergency Medical Dispatch**
**Dr. Russel, lead**

1. **Answering point**
   Certified EMD (national)
   Centers certified
   Certified dispatchers
   Response and responder levels
   Timed response
   Specific protocols-EMD, Powerphone, APCO
   Pre-arrival Instructions
2. **Dispatch response Coordination**
   Early Activation
   Guidelines for EMD
3. **Patient contact by EMS**
   **Nothing required by work group**

**Assessment and Transport**
**Liz Deken, lead**

4. **Identify patient as time critical diagnosis**
   - **Stroke**
     - Universal assessment scale
     - Onset time/history
   - **STEMI**
     - 12 lead early
     - Onset time/history
     - All CP (chest pain) points get 12 lead and suspected history
5. **Assessment Phase**
   - Timely transport decision
   - Destination determination for most appropriate
   - Early notification to medical control

**6. Treatment**
**Valerie Dutcher, lead**

**7. Patient Handoff**
**Theresa Lee, lead**
Summary list

- Times
- Stroke scale
- 12 lead/serial

**8. Hospital Care**

## Stroke Work Group—Dr. Scott Duff, Lead

**Summary**

Key Accomplishment:

- Completed review and discussion of criteria for designating centers at the I, II, and III levels.
- Reviewed the impact of the TCD system on small rural hospitals and decided that it would be appropriate to have a Level IV designation that would allow all hospitals an option to be formally part of the system.

Interface Areas:

- Location of stroke centers in relation to patients' location and time of onset of symptoms will be essential in determination of where EMS should transport the patient.

Key Items for the Next Meeting

- Members are to review criteria proposed and come prepared to finalize and approve
- Professional education requirements

Homework: Review education requirements, identify professional education issues and review center designation criteria.

See Attachment 1 for details on the Stroke Center Designation Levels discussed by the group.

## STEMI Work Group—Dr. George Kichura, Lead

**Summary**

Key Accomplishment:

- Identified key data and information needed to inform decisions on center designations.
- Want information on which facilities perform Percutaneous Coronary Interventions (PCIs) and the volume of PCIs conducted.

Interface Areas:

- STEMI group is divided into four working groups so want to focus first on coordination within their work group before ready to work with others.
    - a/b-Service capacity and performance standards to inform center designation levels.
    - c/d/e-Time frame for service availability and in-hospital protocols.
    - f/g/h-Research, transitions back to primary care and data systems to support quality improvement.
    - I-Professional credentials required and continuing education.

Key Item for the Next Meeting: Review data available to inform center designation criteria.

See Attachments 2-5 for more details on each group's discussion and work products.

# Stroke Center Designation –TCD Stroke Workgroup Recommendations

## Level I
## Comprehensive Stroke Centers

Please note—highlight reflects criteria added that were in Level II requirements.

- Requirements:
  - Meets the requirements specified in the Consensus Statement of Stroke on Comprehensive Stroke Centers. (Recommendations for comprehensive Stroke centers: a consensus statement from the Brain Attack Coalition. Stroke. 2005; 36(7):1597-616.
  - Meets the requirements specified for a Primary Stroke Center as specified by The Joint Commission.
  - Follows current Joint Commission Core Measures:
    - DVT prophylaxis
    - Discharged on antithrombotic therapy
    - Patients with A-Fibrillation receiving anticoagulation
    - Thrombolytic therapy administered
    - Antithrombotic therapy by end of hospital day 2
    - Discharged on cholesterol-reducing medication
    - Dysphagia screening
    - Stroke education
    - Smoking cessation education/advice/counseling
    - Assessed for rehabilitation
  - Follows the Brain Attack Coalition's benchmark treatment times:
    - Door to physician exam = 10 minutes
    - Door to Stroke Activation = 15 minutes
    - Door to CT Scan = 25 minutes
    - Door to CT Report = 45 minutes
    - Door to tPA = 60 minutes
  - Hospital and administrative support
  - Protocols in place for acceptance of transfer patients
- Medical Director—include 3 or more of the following:
  - Board certified neurologist or vascular neurosurgeon with a stroke fellowship or vascular neurosurgery fellowship or equivalent experience
  - Board certified in vascular neurology
  - Fellow of the Stroke Council of the AHA
  - Clinician who diagnoses and treats at least 50 patients with cerebrovascular disease annually
  - Clinician with at least 10 peer-reviewed publications dealing with cerebrovascular disease
  - Clinician with at least 12 CME credits each year in areas directly related to cerebrovascular disease
- Neurologists and Neurosurgeons
  - Neurosurgical expertise must be available 24/7, and make call back within 5 minutes
    - There must be personnel in-house (or be at the hospital within 20 minutes) who are capable of performing emergent neurosurgical procedures

- Must have expertise and experience in microsurgery for aneurysm clipping and surgical excision of AVM's
- Written neurosurgical call schedules must be available
- The institution should care for at least 30 SAH patients per year and should accomplish at least 10 craniotomies per year for aneurysm clipping.
- Each Neurosurgeon should participate in at least 10 cases per year
- Perioperative mortality rate for aneurysm clipping should be documented, reviewed and compared with published outcomes.
- For AVM, treatment should be available including microsurgical excision, endovascular embolization and stereotactic radiosurgery
- 8 CME credits in area directly related to cardiovascular disease

- Acute Stroke Teams
  - Physician with experience in diagnosing and treating cerebrovascular disease
  - Hospital based stroke teams should be available within 15 minutes by phone and at the bedside within the time period as designated by the stroke center director 24/7.
  - Response time may also be accomplished through telemedicine**.**
  - Evidence of stroke team log
    - Response times
    - Patient diagnosis
    - Treatments and actions
    - Outcomes
  - Documentation indicates that on a 24/7 basis, 80 percent of acute stroke patients have a diagnostic brain image completed within 45 minutes of it being ordered
  - Monitoring systems
    - Heart rate / rhythm with automatic arrhythmia detection
    - Blood pressure with noninvasive BP monitoring
    - Oximetry

- Written Care Protocols
  - Written protocols/care paths for the acute workup are available in the
    - ED department
    - Acute care areas
    - Stroke units
      - Ischemic
      - Hemorrhagic
        - Stabilization of vital functions
        - Initial diagnostic tests
        - Use of medications
        - tPA treatment
- Telemedicine/telecommunication
  - Available 24/7
  - Surgeons with expertise in performing CEA's
  - Must perform a minimum number of ____ CEA's per year.
  - Results should be audited on a yearly basis, and the results of a rolling average of at least 3 years should be compared with published outcome and complication rates.

- Diagnostic Radiologists
  - Able to evaluate imaging studies 24/7
  - Available to read scans within 20 minutes of completion
  - Active full time staff
  - Available 24/7
  - Board certified/board eligible

- Interventional endovascular neuroradiologist(s)
  - Active full time staff
  - Available 24/7
  - Board certified/board eligible
- ED personnel (physicians, nurses and EMS)
  - Written care protocols for acute stroke patients should be available to EMS and ED personnel, and should be reviewed and revised annually.
  - Annual review of EMS protocols with EMS medical director should include
    - Rapid, efficient patient assessment and triage
    - Prehospital EMS communication with hospital staff
    - Medical stabilization en route
    - Rapid communication between EMS and ED personnel during the transportation of acute stroke patients
  - ED protocols should include
    - Well-defined and documented procedures for calling the acute stroke team
    - Goal door to needle time of 60 minutes or less for the administration of tPA to stroke patients
  - ED care providers are familiar with
    - Pathology, presentation, assessment, diagnostics, and treatment of patients with acute stroke
    - The location and application of stroke-related protocols, activation of the acute stroke team, and communications with inbound EMS
    - The recognition, assessment and management of acute stroke complications.
  - 80 percent of the ED care providers can provide evidence of review of the acute stroke protocol
  - EMS and ED staff should meet and review patient care issues with the CSC staff at least twice a year
  - At least 2 specific assessment criteria and benchmarks related to acute stroke care should be defined, measured and reviewed annually
  - ED personnel obtain 8 hours of continuing education or equivalent educational program annually that focus on acute stroke care.

    NOTE: STROKE TASK FORCE RECOMMENDS A COMBINED TCD/EDUCATIONAL PROGRAM
- Radiology Technologists
  - In-house CT technician 24/7
  - MRI technician available 24/7 – may take call from home as long as he/she can be at the hospital within 1 hour of being paged
  - CT scans obtained within 25 minutes of being ordered
  - CT image evaluated by qualified personnel within 20 minutes of completion

WE REORGANIZED THE FOLLOWING SECTION INTO STROKE UNIT NURSING AND NEUROSCIENCES ICU NURSING

- Stroke Unit Nursing staff
  - Trained in the care of stroke patients
  - Trained in continuous cardiac and respiratory monitoring
- Dedicated Neurosciences ICU Nursing
  - The ICU nursing director or manager should have at least10 hours per year of CEU training (or equivalent educational activities) related to cerebrovascular disease
  - The nurse: patient ratio in an ICU should be 1:1 or 1:2.
  - The ICU nursing staff must be trained to assess neurologic function and deal with Neurocritical care:
    - Function of ventriculostomy and external ventricular drainage apparatus
    - Treatment of ICP
    - Care of patients with ICH and SAH
    - Care of patients after reperfusion therapy
    - Treatment of Blood Pressure abnormalities with parenteral vasoactive agents
    - Management of intubated / ventilated patients
    - Detailed neurologic assessments and scales
  - The ICU nurses receive at least 10 hours per year of CEU credit (or other educational programs) in areas related to cerebrovascular disease.

    (SHOULD THE NEXT FOUR OPEN CIRCLE BULLETS SHOULD BE UNDER ICU NURSING?)
  - Steps should be taken to reduce the risk of peristroke complications:
    - Cerebral edema
    - Aspiration pneumonia
    - Infection
    - Myocardial infarction
    - DVT
  - Should be familiar with standard neurologic assessments and scales, stroke protocols, care maps, ongoing research projects and new patients care techniques related to stroke.
  - Attend training sessions sponsored by the CSC at least 3 times per year
  - Participate in at least10 hours of CEU activities (or other educational programs annually that are related to or focused on cerebrovascular disease
- Stroke Coordinator - Full time
  - Nurse practitioner or CNS

    *Or*
  - AANN certified registered nurse
  - Implement and coordinate the stroke program

- Physicians with expertise in critical care or neurointensive care
  - Board-eligible or board-certified neurologist, neurosurgeon, anesthesiologist, or internist who has completed either a critical care fellowship or Neurocritical care fellowship
    - Care for at least20 patients with acute strokes per year and attend at least 4 hours per year of CME activities (or similar educational programs related to or focused on cerebrovascular disease
- Physicians with expertise in echocardiography, carotid US, and Transcranial Doppler

    - Technicians may take call from home as long as he/she can be at the hospital within 1 hour of being paged
- Physical Medicine & Rehab physician(s)Rehabilitation services
    - Directed by a physician with board certification in physical medicine and rehabilitation or by other properly trained individuals (i.e., neurologist experienced in stroke rehabilitation)
- Rehabilitation Therapists
    - Consults for physical medicine and rehabilitation, PT, OT, and SLP should be requested and assessment completed within 24 hours of admission if medically indicated
    - All therapists must meet requirements for state licensure
        - At least1 year experience in the treatment of stroke survivors
        - Physical therapists and speech language pathologists must complete a master's degree.
        - Occupational therapists must complete a master's degree
- Case Managers and Social Workers
    - Social Workers and Case Managers must meet requirements for state licensure
        - At least1 year experience in the treatment of stroke survivors
        - Social Workers must complete a master's degree
        - Nurse Case Managers must complete at least a bachelor's degree
        - Nurse Case Managers and Social Workers must have adequate knowledge of inpatient rehabilitation facilities and community resources in their geographic region
- Multidisciplinary team of health care professionals with expertise or experience in stroke representing:
    - Clinical or Neuropsychology
    - Nutrition services
    - Pharmacy (including a Pharmacy Doctorate [Pharm D] with stroke expertise)
- Research
    - Should have the professional and administrative infrastructure necessary to conduct clinical trials
    - Actively participate in ongoing clinical research
- Education
    - Professional programs – CSC staff prepare and present at least 2 educational courses per year aimed at health care professionals within or outside of the CSC, and for Level II and Level IV designated Stroke Centers
    - Public education – CSC sponsor at least 2 public educational activities each year that focus on some aspect of stroke
        - Lectures
        - Screenings
        - Health fairs
- Stroke registry or another similar data collection tool
        - LOS
        - Treatments received
        - Discharge destination and status
        - Incidence of complications
            - Aspiration pneumonia
            - UTI
            - DVT
        - Discharge medications
- Participate in a national and/or state registry (or registries)

    - Acute stroke therapy outcomes
        - IV tPA
        - Endovascular / interventional stroke therapy
- Multidisciplinary institutional quality assurance committee should meet on a monthly basis to monitor quality benchmarks and review complications.
        - Quality improvement
        - Correction of errors
        - Systems improvement
        - Overall care of patients
    - Documentation exists to reflect:
        - Performance measures and indicators tracked
        - Specific interventions to improve in the selected measure
        - Specific outcomes to determine success
        - Implementation period and re-evaluation

- Serve as a resource for Level II, III, and IV designated Stroke Centers.
- Diagnostic Imaging Equipment:
    - MRI
        - Available 24/7
        - If medically indicated, MRI completed within 2 hours of th**e** test being ordered
            - Basic MRI
            - Diffusion-weighted (DWI) MRI
            - Magnetic resonance (MR) perfusion – optional
            - MR angiography (MRA)
            - MR venography (MRV)
    - Catheter Angiography
        - Cerebral Angiography must be available 24/7
            - Digital Subtraction angiography (DSA)
    - CT Angiography
        - CT Angiography (CTA)
        - CT perfusion - optional
    - Extracranial Utrasonography
        - Carotid US
            - Demonstrates acceptable proficiency using guidelines established by the Intersocietal Committee for the Accreditation of Vascular Laboratories (ICAVL) or a similar credentialing organization
    - Transcranial Doppler
        - The TCD laboratory should track their results and seek certification from ICAVL or a similar organization
    - Transthoracic and Transesophagel Echocardiography
    - Tests of Cerebral Blood Flow and Metabolism
    - Comprehensive hematological and hypercoagulability profile testing
- Laboratory Services
    - Available 24/7 for initial stroke labs
        - CBC with platelet count
        - Coagulation studies (PT/INT)

        - Blood chemistries
    - Documentation indicates the ability to complete and report lab tests in less than 45 minutes from being ordered.
    - Documentation indicates the ability to perform an EKG and chest x-ray within the same time frame as laboratory testing.

- Endovascular Therapy
    - Neuroendovascular specialist (eg, endovascular surgical neuroradiologist)
        - Capability to perform microsurgical neurovascular clipping and neuroendovascular coiling
        - IA thrombolysis
        - Mechanical thrombolysis
        - Carotid Angioplasty and stenting
        - Intracranial circulation angioplasty and stenting
    - Registry should be established to track treatments, outcomes, and complications.
      For all the endovascular and surgical procedures performed, the number, indications and outcomes should be recorded and available for review.

- Relationships with Other Stroke Levels
    - Have a documented relationship with Level II, III and Level IV hospitals, to provide professional education as well as to receive transferred stroke patients as needed.

## Level II
## Primary Stroke Centers

- Requirements:
    - Meets the requirements specified by the Brain Attack Coalition's recommendations for a Primary Stroke Center
    - Meets the requirements specified for a Primary Stroke Center as specified by The Joint Commission
    - Follows the Brain Attack Coalition's benchmark treatment times:
        - Door to physician exam = 10 minutes
        - Door to Stroke Activation = 15 minutes
        - Door to CT Scan = 25 minutes
        - Door to CT Report = 45 minutes
        - Door to tPA = 60 minutes
    - Hospital and Administrative support
- Acute Stroke Teams
    - Physician with experience in diagnosing and treating cerebrovascular disease
    - Hospital based stroke teams should be available within 15 minutes by phone and at the bedside within the time period as designated by the stroke center director 24/7.
    - Response time may also be accomplished through telemedicine.
    - Evidence of stroke team log
        - Response times

        - Patient diagnosis
        - Treatments and actions
        - Outcomes
- Written Care Protocols
    - Written protocols/care paths for the acute workup are available in the
        - ED department
        - Acute care areas
        - Stroke units
            - Ischemic
            - Hemorrhagic
                - Stabilization of vital functions
                - Initial diagnostic tests
                - Use of medications
                - tPA treatment
- Emergency Medical Systems
    - Treatment guidelines for pre-hospital personnel
    - EMS protocols should include
        - Rapid, efficient patient assessment and triage
        - Prehospital EMS communication with hospital staff
        - Medical stabilization en route
        - Rapid communication between EMS and ED personnel during the transportation of acute stroke patients
- Emergency Department
    - ED care providers are familiar with
        - Pathology, presentation, assessment, diagnostics, and treatment of patients with acute stroke
        - The location and application of stroke-related protocols, activation of the acute stroke team, and communications with inbound EMS
        - The recognition, assessment and management of acute stroke complications.
    - 80 percent of the ED care providers can provide evidence of review of the acute stroke protocol
- Stroke Units
    - Care providers demonstrate evidence of initial and ongoing training in the care of the acute stroke patient
    - Stroke protocols / care paths are followed
    - Receive 8 hours CEU's (or equivalent educational activity) yearly
    - Monitoring systems
        - Heart rate / rhythm with automatic arrhythmia detection
        - Blood pressure with noninvasive BP monitoring
        - Oximetry
- Neurosurgical Services
    - Neurosurgical services are available within 2 hours of when it is deemed clinically necessary or has protocol for transfer to appropriate facility
    - Facilities that do not transfer patients for neurosurgical emergencies has a fully functional OR facility and staff available within 2 hours of when it is deemed clinically necessary
- Neuroimaging
    - Available 24/7

  - CT scans obtained within 25 minutes of being ordered
  - CT image evaluated by qualified personnel within 20 minutes of completion
  - Review of the images does not have to be done on site. Evaluation can be performed off site by telemedicine technology.
  - Documentation indicates that on a 24/7 basis, 80 percent of acute stroke patients have a diagnostic brain image completed within 45 minutes of it being ordered
- Laboratory Services
  - Available 24/7 for initial stroke labs
    - CBC with platelet count
    - Coagulation studies (PT/INT)
    - Blood chemistries
  - Documentation indicates the ability to complete and report lab tests in less than 45 minutes from being ordered.
  - Documentation indicates the ability to perform an EKG and chest x-ray within the same time frame as laboratory testing.
- Outcomes / Quality Improvement
  - Evidence of specific stroke performance measurement and review by quality improvement department and stroke team.
  - Documentation exists to reflect:
    - Performance measures and indicators tracked
    - Specific interventions to improve in the selected measure
    - Specific outcomes to determine success
    - Implementation period and re-evaluation
- Educational Programs
  - Minimum of one stroke public education activity per year

- Relationships with Other Stroke Level Hospitals
  - Have a documented relationship with Level III and Level IV hospitals, to provide professional education as well as to receive transferred stroke patients as needed.

## Level III
## Support Stroke Centers

- Requirements:
  - Follows the Brain Attack Coalition's benchmark treatment times:
    - Door to physician exam = 10 minutes
    - Door to Stroke Activation = 15 minutes
    - Door to CT Scan = 25 minutes
    - Door to CT Report = 45 minutes
    - Door to tPA = 60 minutes
  - Hospital and Administrative support
  - Transfer agreement in place with either Level I or Level II centers
- Acute Stroke Teams

Acute stroke team members defined by the institution
Physician with experience in diagnosing and treating cerebrovascular disease
- Available within 5 minutes by phone and at the bedside within 20 minutes, 24/7.
- Response time may also be accomplished through telemedicine.

- Evidence of stroke team data collection
  - Response times
  - Patient diagnosis
  - Treatments and actions
  - Outcomes

- Written Care Protocols
  - Written protocols/care paths for the acute workup are available in the ED
    - Ischemic and Hemorrhagic stroke care
- tPA treatment Emergency Medical Systems
  - Treatment guidelines for pre-hospital personnel
  - EMS/first responder protocols should include
    - Rapid, efficient patient assessment and triage
    - Prehospital EMS communication with hospital staff
    - Medical stabilization en route
    - Rapid communication between EMS and ED personnel during the transportation of acute stroke patients to a higher level of care
- Emergency Department
  - ED care providers are familiar with
    - Pathology, presentation, assessment, stroke scales, diagnostics, and treatment of patients with acute stroke
    - The location and application of stroke-related protocols, activation of the acute stroke team, and communications with inbound EMS
    - The recognition, assessment and management of acute stroke complications.
  - 80 percent of the ED care providers can provide evidence of review of the acute stroke protocol
- Neurosurgical Services
  - Neurosurgical services are available within 2 hours of when it is deemed clinically necessary or has protocol for transfer to appropriate facility
- Neuroimaging
  - Review of the images does not have to be done on site. Evaluation can be performed off site by telemedicine technology.
  - Documentation indicates that on a 24/7 basis, 80 percent of acute stroke patients have a diagnostic brain image completed and reviewed within 45 minutes of arrival.
- Laboratory Services
  - Available 24/7 for initial stroke labs
    - CBC with platelet count
    - Coagulation studies (PT/INR)
    - Blood chemistries (CONSIDER CKMB AND TROPONIN)
  - Documentation indicates the ability to complete and report lab tests in less than 45 minutes from arrival.
  - Documentation indicates the ability to perform an EKG and chest x-ray within the same time frame as laboratory testing.
- Outcomes / Quality Improvement

    - Evidence of ongoing specific stroke performance measurement and review by quality improvement department and stroke team.
    - Documentation exists to reflect:
        - Performance measures and indicators tracked
        - Specific interventions to improve in the selected measure
        - Specific outcomes to determine success
        - Implementation period and re-evaluation
- Educational Programs
    - Minimum of one stroke public education activity per year
    - Stroke team members:
        - NIHSS certification maintained
        - tPA competency annually
        - TCD education
- Documented Relationships with either a Level I or Level II Stroke Center
    - Have a documented relationship with Level I and Level II hospitals, to receive professional education as well as to transfer stroke patients to those facilities as needed.

## Level IV
## Hospitals

- Requirements:
    - These hospitals have an established relationship with a Level I, II or III hospital for management and transport of the acute stroke patient.
    - ED staff trained in recognition of stroke signs and symptoms**.**
    - Protocols in place for rapid identification and transport

## Resources

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14. Review State legislative stroke center designation (from Texas)

*Time Critical Diagnosis-Stroke/STEMI Implementation*
*Meeting Two, October 21, 2008*
*Attachment 2—Hospital-STEMI Work Group—Summary of Sub-Group Discussions*

## STEMI Hospital Work Group-Sub-Group Discussions

The STEMI Hospital Work Group broke into their smaller groups to work on specific criteria for STEMI center designation to be incorporated into rules and regulations. Specific items reviewed by each group are highlighted below. The STEMI group convened as a whole to bring the other groups up to date on individual small group progress.

**A/B Group—Criteria Elements Addressed:**

a. hospital equipment, technology and service capacity to support STEMI care (e.g., number of PCIs conducted in a given time frame, availability of surgical backup)
b. ability to meet time and performance standards for delivery of specified services (e.g., door to balloon time)

The A/B group discussed the above criteria for the various levels of STEMI care. Criteria for Level I and Level II were fairly easy to delineate. For example, only Level I Centers will need to be engaged in research and have 24 hour x 7 days a week (24x7) surgical backup, but both Levels I and II will need to have one-call access to the cath lab team via the Emergency Department and 24x7 lab capabilities. Criteria for Level III are less well defined, and the group did not yet determine if a Level IV is indicated. All three levels must have a STEMI Medical Director and STEMI Program Manager, a formal STEMI Continuous Quality Improvement process, staff credentialing and public education for STEMI signs and symptoms, emergency transport and STEMI treatment.

The group is cautiously moving forward on defining institutional and/or individual provider Percutaneous Coronary Intervention (PCI) volume requirement for Levels I and II. There is a clustering of Door-to-Balloon (D2B) hospitals in the metro areas, with other non-D2B hospitals providing PCI. The group is considering the criteria of 200+ elective PCIs per year or 36+ PCI procedures for STEMI annually for Level I and possibly Level II, but is lacking data that would be helpful in making these determinations (such as, how many and what non-D2B hospitals provide PCI, when is PCI provided and at what volumes?). The Missouri Hospital Association may be able to provide this data. The A/B group will pursue possible sources of additional data, with the group re-convening on a conference call before the December 2nd meeting date. The group is carefully making these determinations, since much will rest on these decisions. Once the decision regarding volume for Levels I and II is made, the group's subsequent tasks will be simpler.

**C/D/E Group—Criteria Elements Addressed:**

c. diversion avoidance policy (renamed barriers) in regards to TCD patients
d. time frame for availability of services (e.g. 24 hours a day x 7 days a week)
e. hospital protocol for 1) pre-hospital and STEMI team communication, 2) care and coordination, and 3) when appropriate, rapid transfer from non-PCI to PCI facility)

A brief overview of the group proposal was discussed to update new members. Shandy provided a draft that included criteria for Levels I, II and III STEMI center designation for items C, D and E. There are challenges and the group determined that common language is a priority. Group representatives shared personal experiences and concerns.

There are several important issues. The Critical Access Hospitals vary in their services and patient volumes. Transfers across state lines will be a critical consideration. Following the Trauma System design, it was recommended that the regulations include "facility follows transfer agreement guidelines".

The C/D/E group will review the updated draft template and send comments. A conference call may be scheduled, if needed.

**F/G/H Group—Criteria Elements Addressed:**

f. institution involvement in clinical research related to heart disease or STEMI
g. Hospital capacity to support STEMI patient care and discharge transition back to care and oversight by their primary care physician in either home or referral setting
h. ability to report data and maintain QI process as required for given center designation

The F/G/H group is using the National Institute of Health's definition of clinical research, which includes:

1. Patient-oriented research. Research conducted with human subjects (or on material of human origin such as tissues, specimens and cognitive phenomena) for which an investigator (or colleague) directly interacts with human subjects. Patient-oriented research includes:
    - mechanisms of human disease,
    - therapeutic interventions,
    - clinical trials, or
    - development of new technologies.
2. Epidemiologic and behavioral studies.
3. Outcomes research and health services research.

This definition will be used for STEMI Center designation. The group has developed a framework for STEMI Center designation for items F, G and H and will continue to work through the issues.

**I Group —Criteria Elements Addressed:**

i. credentials and abilities of personnel to perform TCD protocol and provide care services for STEMI patients

The I group has developed a template for personnel credentials for Levels I, II and III center designation. Some of the criteria will be recommended initially and required by a certain date in time. The group is attempting to write in general terms. Facilities that are not cath lab capable were also addressed. This group is awaiting group A's center level designation results to better inform these decisions.

***Time Critical Diagnosis-Stroke/STEMI Implementation***
***Meeting Two, October 21, 2008***
***Attachment 3—Hospital-STEMI Work Group—STEMI Hospital Requirements (Group A/B)***

| Criteria | Level I | Level II | Level III |
|---|---|---|---|
| **Volume:** | | | |
| 200+ Elective PCI/year | x | | |
| 336+ PCI procedures for STEMI/year | x | | |
| **Hospital Capabilities:** | | | |
| Cardiac Rehab available onsite/within network | x | x | x |
| Designated ICU for STEMI patients | x | x | x |
| 24x7 Laboratory to provide necessary testing and results | x | x | |
| One call access to cath lab team via ED | x | x | |
| Formal alliance with Level I/Level II STEMI Center to transfer complex patients | | x | x |
| Protocols for triage, transfer, and/or treatment of STEMI patients in ED | | x | x |
| STEMI Medical Director | x | | |
| STEMI Program Manager | x | | |
| 24x7 Surgical Backup | x | | |
| Angiography and interventional capabilities available on 24x7 basis | x | | |
| | | | |
| **Performance Metrics:** | | | |
| PCI within 90 minutes of arrival (x% of time) | x | x | |
| Lytics within 30 minutes of arrival (x% of time) | | x | x |
| Formal STEMI/AMI CQI process | x | x | x |
| **Personnel Education/Credentials:** | | | |
| RN credentialing for STEMI care | x | x | x |
| Medical Director CEU hours | x | x | x |
| Emergency Department RN CEUs | x | x | x |
| Minimum CEU requirements for ED and Cath Lab staff | x | x | x |
| **Community Education:** | | | |
| Public education program for STEMI signs/symptoms, emergency transport, STEMI treatment | x | x | x |
| Ability to collect and report data to STEMI registry/STEMI reporting to DHSS | x | x | |
| Cardiology outreach program for 24 hour phone consults | x | | |
| **Research:** | | | |
| Active research program focusing on STEMI | x | | |

*Time Critical Diagnosis-Stroke/STEMI Implementation*
*Meeting Two, October 21, 2008*
*Attachment 4—Hospital-STEMI Work Group—STEMI Hospital Requirements (Group C/D/E)*

| | Level I | Level II | Level III |
|---|---|---|---|
| **C. Diversion avoidance policy in regards to TCD Patients** | Process in place for acceptance of all STEMI patients | Process in place for acceptance of all STEMI patients unless cath lab not available. | Process in place for acceptance of all STEMI patients as determined by physician and EMS communication for reperfusion strategy. |
| **D. Time frame for availability of services** | 24/7 ED, Cath lab and CABG capability | 24/7 ED with intermittent cath lab able to take STEMI some hours in the week | ER- 24/7 with physician in-house |
| **E1. Hospital protocol for pre-hospital and STEMI team communication** | EKG, hear system 24/7 and access to EM system. Mechanism in place for activation of Cardiac Cath lab team from time of EMS STEMI identification | EKG, hear system 24/7 and access to EM system. Mechanism in place for activation of Cardiac Cath lab team from time of EMS STEMI identification | EKG, hear system 24/7 and access to EM system. Mechanism in place for activation of Cardiac Cath lab team from time of EMS STEMI identification |
| **E2. Hospital protocol for care and coordination** | All credentialed in STEMI: ED MD/DO, Cardiologist Interventionalist, ED RN, Cath Lab Team, ICU RN, Telemetry RN and Accredited Cardiac Rehab in-house. A written network agreement for the provision of cardiac rehabilitation post discharge | All credentialed in STEMI: ED MD/DO, Cardiologist Interventionalist, ED RN, Cath Lab Team, ICU RN, Telemetry RN and In-house Cardiac Rehab. A written network agreement for the provision of cardiac rehabilitation post discharge. | All credentialed in STEMI: ED MD/DO, ED RN<br>Cardiac Rehab access available with a written network agreement for the provision of cardiac rehabilitation post discharge. |
| **E3. Hospital protocol for when appropriate, rapid transfer from non-PCI facility** | Accept all STEMI transfers | Accepts all transfer when cath lab available. Rapid transfer process in place when cath lab not available with a higher level of STEMI center. | A rapid transfer process in place with higher level of STEMI care. |

***Time Critical Diagnosis-Stroke/STEMI Implementation***
***Meeting Two, October 21, 2008***
***Attachment 5—Hospital-STEMI Work Group—STEMI Credentials and Competency Table (Group I)***

*Level 1-heart transplant capable centers* *R-Recommended*
*Level 2-24 x 7 PCI/Coronary Artery Bypass Grafting (CABG)* *D-Desired*
*Level 3-24 x 7 PCI, no onsite CABG*
*Level 4-limited PCI or no catheterization capacity*

| Category | Position | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|---|
| **ED** | | | | | | |
| Physicians | **Medical Director** | | | | | |
| | BCEM Recommended | | | | | |
| | BCEM required by 2020 | | | | | |
| | 5 hours CME every 3 years or participation in one hospital-sponsored grand rounds every two years on the management of ACS and STEMI* | | | | | |
| | ACLS | | | | | |
| | Demonstrate ECG interpretation competency under the purview of the hospital PI committee | | | | | |
| | Must be a member of the STEMI/ACS oversight committee | | | | | |
| | | | | | | |
| | **Emergency Physician** | | | | | |
| | BCEM Recommended | | | | | |
| | New hire physicians: BCEM required by 2020 | | | | | |
| | 5 hours CME every 3 years or participation in one hospital-sponsored grand rounds every two years on the management of ACS and STEMI* | | | | | |
| | ACLS | | | | | |
| | Demonstrate ECG interpretation competency under the purview of the hospital PI committee | | | | | |
| | | | | | | |
| | **Other Physicians** | | | | | |
| | ACLS | | | | | |
| | 5 hours CME every 3 years or participation in one hospital-sponsored grand rounds every two years on the management of ACS and STEMI* | | | | | |
| | | | | | | |
| | | | | | | |
| Nurses | ACLS | | R | | | |
| | 60% of staff CEN by 2020 | | R | | | |

Attachment 5, *STEMI Credentials and Competency Table*, continued

*Level 1-heart transplant capable centers* *R-Recommended*
*Level 2-24 x 7 PCI/Coronary Artery Bypass Grafting (CABG)* *D-Desired*
*Level 3-24 x 7 PCI, no onsite CABG*
*Level 4-limited PCI or no catheterization capacity*

| Category | Position | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|---|
| | Annual ACS course demonstrating ACS/STEMI competency to include the minimum:<br>• Obtaining a 12-lead ECG<br>• Obtaining a right-sided ECG<br>• ECG ST-segment and T-wave interpretation<br>• Signs and symptoms of ACS in patients<br>• Signs and symptoms of ACS in patient with co-morbidities<br>• Gender differences in the symptoms of ACS<br>• Age-related differences in the symptoms of ACS<br>• Identifying major dysrhythmias | | | | | |
| | | | | | | |
| Allied Health Professionals | Annual competencies including<br>• Obtaining a 12-lead ECG<br>• Obtaining in right-sided ECG | | | | | |
| | | | | | | |
| Cardiology | | | | | | |
| Medical Director of the Cath Lab | BCIM | | R | | | |
| | BCCV | | R | | | |
| | BCIC required by 2020 | | D | | | |
| | 5 hours CME every 3 years or participation in one hospital-sponsored grand rounds every two years on the management of ACS and STEMI* | | | | | |
| | ACLS | | | | | |
| | Must be a member of the STEMI/ACS oversight committee | | | | | |
| | | | | | | |
| Interventional Cardiologist | BCIM | | R | | | |
| | BCCV | | R | | | |
| | Recommended BCIC | | R | | | |

Attachment 5, *STEMI Credentials and Competency Table*, continued

*Level 1-heart transplant capable centers* *R-Recommended*
*Level 2-24 x 7 PCI/Coronary Artery Bypass Grafting (CABG)* *D-Desired*
*Level 3-24 x 7 PCI, no onsite CABG*
*Level 4-limited PCI or no catheterization capacity*

| Category | Position | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|---|
| | BCIC | | D | | | |
| | 5 hours CME every 3 years or participation in one hospital-sponsored grand rounds every two years on the management of ACS and STEMI* | | | | | |
| | ACLS | | | | | |
| | | | | | | |
| Nurses | ACLS | | | | | |
| | Technological Competencies including:<br>• IABP<br>• LVAD<br>• Temporary Pacer | | | | | |
| | Annual ACS course demonstrating ACS/STEMI competency to include the minimum:<br>• Obtaining a 12-lead ECG<br>• Obtaining a right-sided ECG<br>• ECG ST-segment and T-wave interpretation<br>• Signs and symptoms of ACS in patients<br>• Signs and symptoms of ACS in patient with co-morbidities<br>• Gender differences in the symptoms of ACS<br>• Age-related differences in the symptoms of ACS<br>• Identifying major dysrhythmias | | | | | |
| | Demonstrated competency of medical education and complication management | | | | | |
| | | | | | | |
| Cath Lab Technicians | ACLS | | | | | |
| | Recommended RCVT, RCIS | | | | | |
| | RCVT, RCIS by 2020 | | | | | |
| | | | | | | |

Attachment 5, *STEMI Credentials and Competency Table*, continued

*Level 1-heart transplant capable centers* *R-Recommended*
*Level 2-24 x 7 PCI/Coronary Artery Bypass Grafting (CABG)* *D-Desired*
*Level 3-24 x 7 PCI, no onsite CABG*
*Level 4-limited PCI or no catheterization capacity*

| Category | Position | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|---|
| Post-STEMI Cardiac After-care | | | | | | |
| Medical Director | BCIM | | | | | |
| | BCCV | | | | | |
| | 5 hours CME every 3 years or participation in one hospital-sponsored grand rounds every two years on the management of ACS and STEMI* | | | | | |
| | ACLS | | | | | |
| | Must be a member of the STEMI/ACS oversight committee | | | | | |
| | | | | | | |
| Physicians | BCIM | | | | | |
| | BCCV | | | | | |
| | 5 hours CME every 3 years or participation in one hospital-sponsored grand rounds every two years on the management of ACS and STEMI* | | | | | |
| | ACLS | | | | | |
| | | | | | | |
| Nurses | ACLS | | | | | |
| | Technological Competencies including:<br>• IABP<br>• LVAD<br>• Temporary Pacer | | | | | |
| | Annual ACS course demonstrating ACS/STEMI competency to include the minimum:<br>• Obtaining a 12-lead ECG<br>• Obtaining a right-sided ECG<br>• ECG ST-segment and T-wave interpretation<br>• Signs and symptoms of ACS in patients<br>• Signs and symptoms of ACS in patient with co-morbidities<br>• Gender differences in the symptoms of ACS | | | | | |

Attachment 5, *STEMI Credentials and Competency Table*, continued

*Level 1-heart transplant capable centers* *R-Recommended*
*Level 2-24 x 7 PCI/Coronary Artery Bypass Grafting (CABG)* *D-Desired*
*Level 3-24 x 7 PCI, no onsite CABG*
*Level 4-limited PCI or no catheterization capacity*

| | | | | | | |
|---|---|---|---|---|---|---|
| | • Age-related differences in the symptoms of ACS<br>• Identifying major dysrhythmias | | | | | |
| | Demonstrated competency of medical education and complication management | | | | | |
| | CCRN: 60% recommended by 2012 | | | | | |